DUAL CENTRIFUGAL FAN STRUCTURE AND HEAT DISSIPATION DEVICE HAVING THE FAN STRUCTURE

BACKGROUND OF THE INVENTION

The present invention relates in general to dual centrifugal fan structure and a heat dissipation device for the fan structure, and more particularly, to a fan structure having two centrifugal fans and a heat dissipation device having the fan structure.

Figure 1 shows a conventional heat dissipation device 1a applied to a central processing unit (CPU) 2a. The heat dissipation device 1a comprises a heat sink 10a and an axial-flow fan 11a. The heat sink 10a includes a substrate 100a attached to the top surface of the central processing unit 2a and a plurality of vertical fins 101a integrally formed on the substrate 100a. The axial-flow fan 11a is mounted on the fins 101a. Therefore, when the central processing unit 2a is operating, the heat generated thereby is conducted towards the fins 101 through the substrate 100a and circulated by the fan 11a to be absorbed by ambient air.

The upgraded technology provides more powerful functions and faster operation speed of the central processing unit 2a. As a consequence, the heat generated thereby is increased. However, the overall heat dissipation efficiency of the conventional heat dissipation device does not comply with the increased heat. Further, as the air generated by the axial-flow fan 11a is circulated downwardly, the heat cannot be dissipated to the ambient.

Therefore, there exist deficiency for practically application of the above-mentioned conventional heat dissipation device. There is thus a substantial need to provide a dual centrifugal fan structure and a heat dissipation device having the fan structure that resolves the above drawbacks and can be used more conveniently and practically.

SUMMARY OF THE INVENTION

The present invention provides a dual centrifugal fan structure and a heat dissipation device having the fan structure. The fan structure has two fans arranged

in parallel with each other for heat dissipation, such that the overall heat dissipation efficiency of the heat dissipation device is enhanced.

The centrifugal fan structure provided by the present invention includes a first centrifugal fan, a second centrifugal fan, and a housing. The housing is a hollow enclosure divided into a first chamber and a second chamber for installing the first and second centrifugal fans, respectively. The first and second chambers have first and second air inlets, respectively. The housing further comprises an air outlet.

The present invention further provides a heat dissipation device which comprises a heat sink, a wind mask mounted on the heat sink, and a first and second centrifugal fans are arranged in parallel on top of the wind mask.

These and other objectives of the present invention will become obvious to those of ordinary skill in the art after reading the following detailed description of preferred embodiments.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF ACCOMPANIED DRAWINGS

The above objects and advantages of the present invention will be become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

Figure 1 shows the operation status of a conventional heat dissipation device;

Figure 2 is an exploded view of a heat dissipation device in a first embodiment of the present invention;

Figure 3 is a perspective view of the heat dissipation device as shown in Figure 2;

Figure 4 is a cross sectional view of the heat dissipation device as shown in Figure 2;

Figure 5 is a cross sectional view of a heat dissipation device in a second embodiment of the present invention;

Figure 6 is a cross sectional view of a heat dissipation device in a third embodiment of the present invention;

Figure 7 is a cross sectional view of a heat dissipation device in a fourth embodiment of the present invention; and

Figure 8 shows a perspective view of a heat dissipation device in a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENT

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

As shown in Figures 2 and 3, exploded view and perspective view of a heat dissipation device of the present invention. The heat dissipation device includes a dual centrifugal fan structure. In this embodiment, the dual centrifugal fan structure includes a housing 10, which is divided into a first chamber 101 and a second chamber 102 arranged in left-hand side and right-hand side, respectively, as shown in Figure 4. The fan structure further comprises a first centrifugal fan 11 and a second centrifugal fan 12 disposed in the first and second chambers 101 and 102, respectively.

The first and second chambers 101 and 102 include a first air inlet 103 and a second air inlet 104 formed at the top of the housing 10. An air outlet 105 is formed at the bottom of the housing 10. The air outlet 105 extends to both first and second chambers 101 and 102.

The first and second centrifugal fans 11 and 12 include centrifugal blades 110 and 120 and motors 111 and 121 for driving the centrifugal blades 110 and 120, respectively. The blades 110 and 120 are oriented towards opposite directions, such that rotation directions of the first and second centrifugal fans 11 and 12 are opposite to each other as shown in Figure 4. The first and second centrifugal fans 11 and 12

are mounted inside of the first and second chambers 101 and 102 by a pair of support arms 106 formed in the first and second chambers 101 and 102. The support arms 106 are also operative to support and interlink the motors 111 and 121 within the first and second chambers 11 and 12.

As shown in Figure 4, the fan structure includes a wind mask 2 and a heat sink 3. The heat sink 3 includes an aluminum extrusion type heat sink or other types of heat sinks. As shown, the heat sink 3 comprises a thermal conductive substrate 30, a plurality of fins 31 extending from the thermal conductive substrate 30, and a plurality of channels 32 formed between the fins 31.

The wind mask 2 is disposed over the heat sink 3 under the dual centrifugal fan structure 1. The wind mask 2 has a top panel and a sidewall extending from a periphery of the top panel. Preferably, the wind mask 2 has an n-shape cross section. The top panel is open with two through holes 20 and 21 aligned with the air outlet 105 of the housing 10. A protruding rim 100 is formed along a bottom periphery of the housing 10. A protruding rim 100 is formed to extend outwardly from a bottom periphery of the housing 10. A plurality of holes 107 is formed through the protruding rim 100, and a plurality of threaded holes 22 are formed through the top panel of the wind mask 2, such that the housing 10 can be fitted on top of the wind mask 2 using fastening devices such as screws extending through the holes 107 and the holes 22 aligned therewith. The sidewall of the wind mask 2 can also be engaged with the thermal conductive substrate 30 of the heat sink 3 in the same manner.

As shown in Figure 4, when the heat dissipation device is applied to a central processing unit (CPU) 4, the fan structure 1 facilitates heat dissipation by activate opposite rotation of the fans 11 and 12, which then circulate and dissipate heat generated by the central process unit 4 towards two lateral sides of the channel 32 between the fins 33. Thereby, a good heat dissipation effect is resulted.

Figure 5 shows an operation status of the heat dissipation device. In this embodiment, the heat sink 3 includes a thermal conductive substrate 30. The

thermal conductive substrate 30 has a central spike 33 formed by a pair of curves descending towards two elongate sides of the substrate 30. Therefore, wind or air generated by the fans 11 and 12 can be circulated towards the channels between the fins 33, such that direct impact of air can be suppressed.

As shown in Figures 6 and 7, cross sectional views of the third and fourth embodiments are shown. The first and second air inlets 103 and 104 of the housing 10 are formed at two lateral sides of the housing 10 (as shown in Figure 6) or at the front and rear ends of the housing (as shown in Figure 7).

Figure 8 shows the fifth embodiment of the present invention. In this embodiment, the housing 10 includes separate first housing 10' and second housing 10", and the fans 11 and 12 disposed in the first and second housings 10' and 10" are aligned with the vent holes 20 and 21 at the top of the wind mask 2.

While the present invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those of ordinary skill in the art the various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.